School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

vol. V no. 4

December, 1945

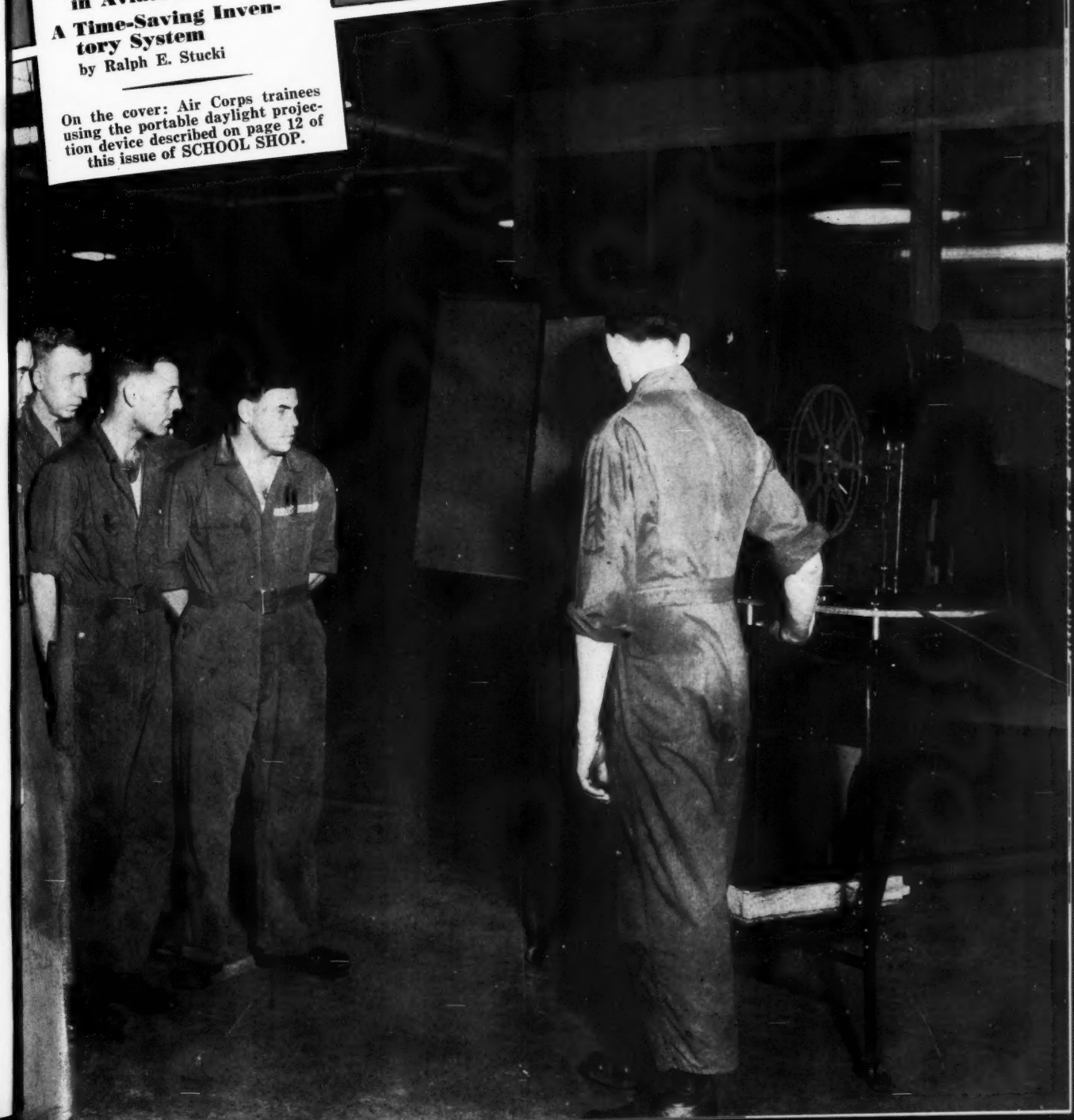
Radio Training with Visual Aids
by Carl Winter

Welding Projects in the School Shop
by Lawson Miller

A School Shop Program in Aviation

A Time-Saving Inventory System
by Ralph E. Stucki

On the cover: Air Corps trainees using the portable daylight projection device described on page 12 of this issue of SCHOOL SHOP.



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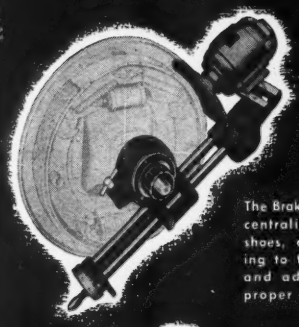

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Season's Greetings

Our wish for all SCHOOL SHOP readers is the pleasantest peacetime Christmas possible and a happy and successful new year! To youth it is always a bright new world, but 1946 should be even more so with peace a reality. There is a glorious opportunity ahead. We know the teachers of the nation will make the most of it.

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School Shop

FOR INDUSTRIAL EDUCATION TEACHERS

December, 1945
Vol. V, No. 4

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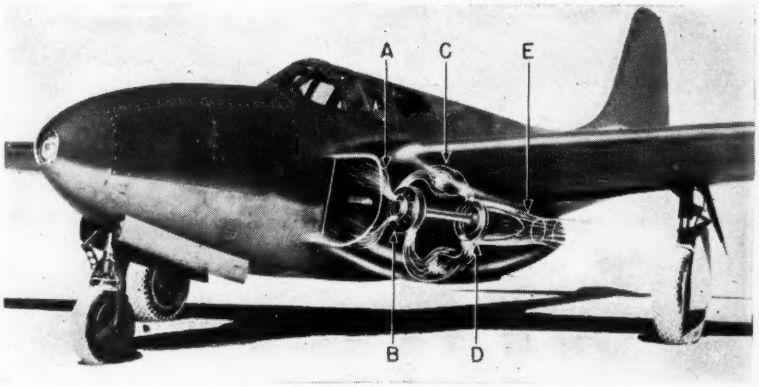

THE FORCE THAT DRIVES A JET PLANE is the same kind of force that pushes a canoe away when you jump to the dock . . . that makes a deflating toy balloon scurry when it slips from your fingers . . . that spins a rotary lawn sprinkler in a direction opposite to that of the jets of water. Forward thrust of a jet propelled plane is developed as the reaction to the high-velocity discharge through the engine's nozzle. It's the practical application of Newton's third law of motion—that for every action there is an equal and opposite reaction.

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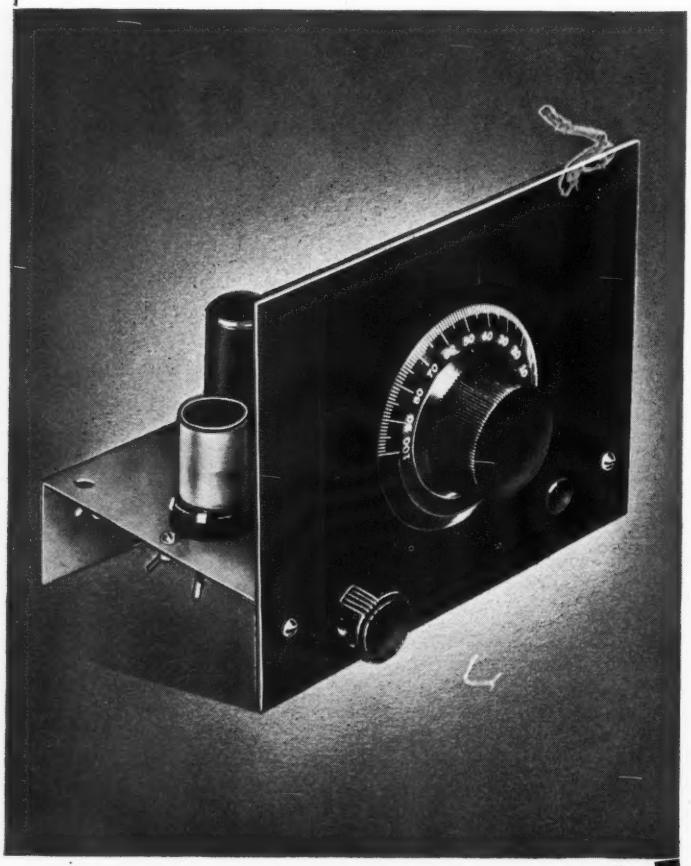

Here is a real teaching help that will give you the chance to add *practical* radio to your science or shop program. This Meissner Student Kit, accepted by the Signal Corps and Navy for primary radio instruction, makes it possible for your students to actually work with the theories they learn in the classroom.

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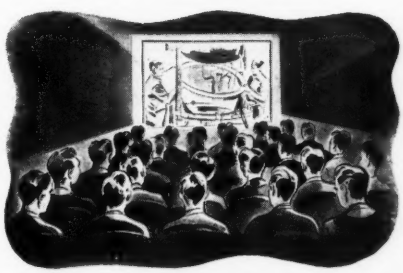

You may borrow an interesting 16mm sound film about PLEXIGLAS, showing methods of PLEXIGLAS fabrication, maintenance, and repair. It is a film all shop instructors and students should see.

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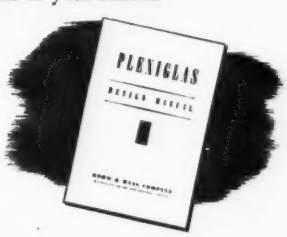

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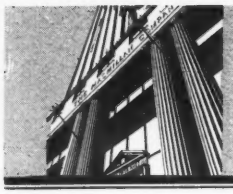

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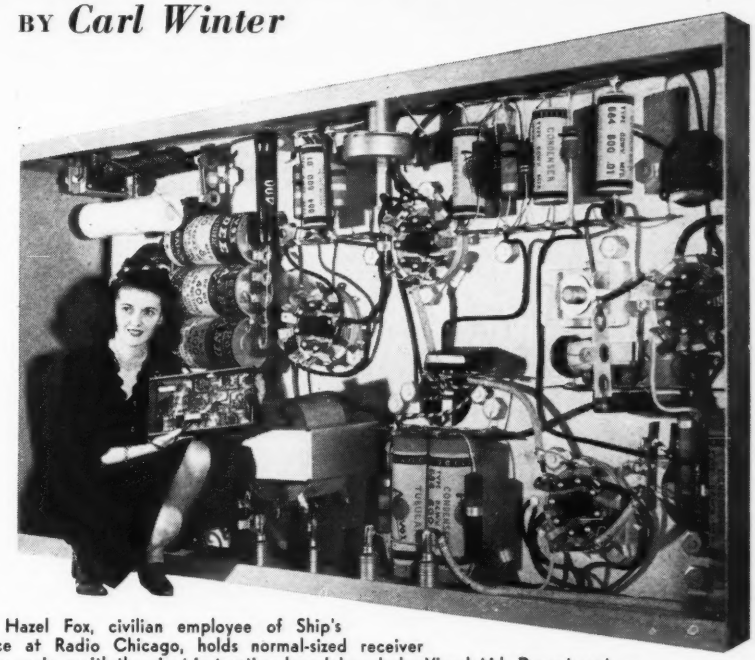
$4.25 *(Probable)*

Radio Training with Visual Aids

BY *Carl Winter*

The Armed Forces have demonstrated in their training programs that visual aids are highly effective in making instruction more efficient. They have also demonstrated that many of the aids can be easily made with the facilities available in most school shops, IF the teacher has a little imagination and foresight. This article is reprinted by permission from the October, 1945, issue of Radio News.



Miss Hazel Fox, civilian employee of Ship's Service at Radio Chicago, holds normal-sized receiver for comparison with the giant instructional model made by Visual-Aids Department.

RADIO CHICAGO, the primary school of the U. S. Navy's Radio Technician Training Program, is doing a big and important job in the training of men to repair and maintain radar equipment, radio direction finders, u.h.f. equipment, and other devices. When these men complete their radio technician training less than one year after entering the program, they are radio and radar technicians qualified to keep many types of the Navy's electronic equipment operating at top efficiency.

The thoroughness of the Navy training is, in itself, almost as great a scientific wonder as the marvelous equipment with which the students work. To assemble a conglomeration of men of all ages and backgrounds, possessing varying degrees of aptitude and general knowledge, put them through schooling comparable to some collegiate science courses, and within a year bring them to a mutual level of ability as highly skilled technicians in a field as abstractly theoretical as electronics indeed requires a scientific approach. If any one method of instruction can claim credit for the rapid development of these potential radio technicians, that method would be the extensive visual-aid program which is a vital adjunct to the teaching technics used at these radio schools.

The training given radio technicians deals only with material associated with the theory and practice of radio and radar maintenance. This fact alone streamlines and differentiates the course from college engineering curriculums, and the use of visual aids in presenting theory and practice to the student has been found to be of invaluable assistance in the transmission of new knowledge.

The results which have been achieved by means of visual aids in the field of adult education have aroused the interest of educators throughout the country.

The Radio Technician Training Program, as it is set up today, involves several educational helps. The first step in the program requires that the applicant for radio technician training successfully pass the special aptitude test which is designed to select only those best qualified and most likely to complete the prescribed course. This preselection of the students is accomplished by means of the well-known "Eddy Test." This test, which was devised and developed by Captain William C. Eddy, is not a measure of man's technical or mechanical background, but it does preclude a better-than-average working knowledge of high-school mathematics and physics. While these two subjects receive the primary emphasis in the examination, it is also necessary for the applicant to understand certain phases of general science, shop practice, elementary electricity, and radio.

Lt. (j.g.) A. L. Rogers, W90ZE, Visual-Aids Officer of Radio Chicago, holds a normal-sized coil for comparison with the instructional coil made by visual aids.

The "Eddy Test" is roughly divided into five categories covering approximately 80 questions on mathematics, physics, shop practice, electricity, and radio. In the field of mathematics, it is necessary for the applicant to be able to perform simple mathematical operations such as cancellations, division, multiplication, addition of algebraic fractions, square roots, percentages, equations, logarithms, etc. The part of the test covering physics requires a working knowledge of heat, light, magnetism, sound, and other phases of general science. Shop practice covers the use of various tools including micrometers, hand tools, the reading of shop drawings, the correct use of files, screws, bolts, soldering irons, etc. The requirements for electricity and radio cover Ohm's Law, d-c circuits, elements of a-c theory, basic receiver principles, vacuum tubes, and circuit components.

The test breaks down into 40 percent mathematics, 20 percent basic physics, 15 percent basic electricity, 15 percent basic radio, and 10 percent shop practice. The grades received by the students in these tests are entered as part of their Navy record and these records have resulted in a careful study of case histories and several revisions in

the "Eddy Test," but basically the test remains about the same as it was at the time of its adoption in the early part of 1942.

On the successful completion of the "Eddy Test" and providing the candidate meets all of the physical and other requirements of the Navy, the student is sent to "boot" training, where he must first of all become a sailor before he becomes a specialist.

In boot training the student learns how to sling a hammock, how to tell port from starboard, and, in general, become a sailor. During this period, which lasts from five to twelve weeks, he can talk radio and dream radar to his heart's content but nary a radio tube or textbook does the candidate see.

After completion of "boot" training, the candidate enters preradio school, in which, during a month's course of intensive study, he reviews high-school algebra, learns the elements of electricity and the fundamentals of shop practices by means of lectures and laboratory classwork. In this school the student is first introduced to the visual-aid method of instruction.

The use of the slide rule is taught by means of a giant nine-foot model of its familiar counterpart. The model is constructed to scale and is capable of being operated by the instructor. Problems worked by means of the slide rule are illustrated by the instructor, who makes the proper setting on the large scale model and the class then performs the proper operation on individual rules.

In a similar manner, recognition of tools and the proper use of various shop equipment is taught. Sharpening of bits and twist drills become easier for the student because giant models of the grinding operation and cutting surfaces of the tools are available for comparison.

Thus, when the student completes his work at the preradio school, he is already familiar with many of the visual aids which he will meet time and again in primary and secondary schools.

In the primary schools, the student begins his work on radio equipment and associated test equipment in earnest. Each student, before his graduation from the primary school, is required to construct a complete five-tube superheterodyne receiver. The proper placement of parts and the general layout of the chassis are taught by means of a giant receiver which is exactly scaled to the original. The theory of radio operation is also taught by means of this gigantic receiver, which is large enough for a six-foot man to move around in comfortably.

In the courses in shop practice, the correct use of soldering irons, micrometers, and hand tools are continued at a high level by means of large scale models of each of these instruments. In specific instances, the use of visual aids has cut the training time in almost unbelievable amounts. In one experiment involving the installation of an octal tube socket in a chassis and the soldering of wire leads from a resistor network to certain socket prongs, 55 minutes were lopped off the instruction time by the use of a visual aid. Before the adoption of this instruction technic, it was the practice of the instructor to lecture to the students for a one-hour period on the correct practices involved in performing this operation. By means of the oversized models constructed by the Visual-Aids Department, the lecture time was cut to a five-minute preliminary outlining of the problem to be done.

In similarly dramatic fashion, the operation of the oscilloscope and correct interpretation of patterns on its screen is taught to the students by means of a 20" oscilloscope which is easily visible to the entire class during the instructor's lecture-demonstration. Since most of the features of the more readily portable units are incorporated on this demonstration 'scope, the class is thoroughly familiar with the operation of all the controls when he begins work on the oscilloscope projects.

The testing of meters, which has always been considered an extremely difficult subject to teach to groups because of the small size of most meter parts, has been facilitated by means of model meters which are built eight times normal size. Every detail down to the last coil turn is duplicated faithfully by the model makers.

In addition to individual pieces of equipment the student becomes familiar with several other types of visual aids during his course of study. Circuits of various pieces of equipment are "blown up" and built onto a demonstration board. In some working models the operation of a receiver may be demonstrated and the signal traced through the circuit by means of electrically operated indicating devices.

(Left) Jack Phillips, Specialist (X) 1/C of Long Island, New York, demonstrates the large-sized micrometer used for instructional purposes. The normal sized unit is shown for comparison. (Center) Students are taught correct procedures for maintaining and servicing soldering irons from this giant model being supported by Francis Mair, Specialist (X) 1/C of Streatorville, Illinois. Mr. Mair is the head of the Visual-Aids Department of Radio Chicago. (Right) The Du Mont 20-inch oscilloscope is being used by Chief Ernest Sindelar, Chief Instructor of Radio Chicago, to instruct Charles O. Whitehead, Radio Technician 2/C, of Columbus, Mississippi, on correct operating procedure.

Various types of tubes, both receiving and transmitting, become familiar to the student because actual tubes are mounted on demonstration panels for his inspection. In addition to this familiarization process, the Visual-Aids Department builds giant stripped-down models of the internal construction of the tube showing all working parts, without the glass envelope in place.

Great care goes into the construction of each unit turned out by the visual-aids group so that every feature of the model closely resembles or duplicates the characteristics of the original, including solder joints, etc.

The great majority of the visual aids in use at Radio Chicago have been the handiwork of the Visual-Aids Department connected with the school. From a small beginning in November of 1942, when the first artist was assigned to the school, this department has expanded until today it is a full-fledged organization working full-time on the job of preparing training aids for the Navy.

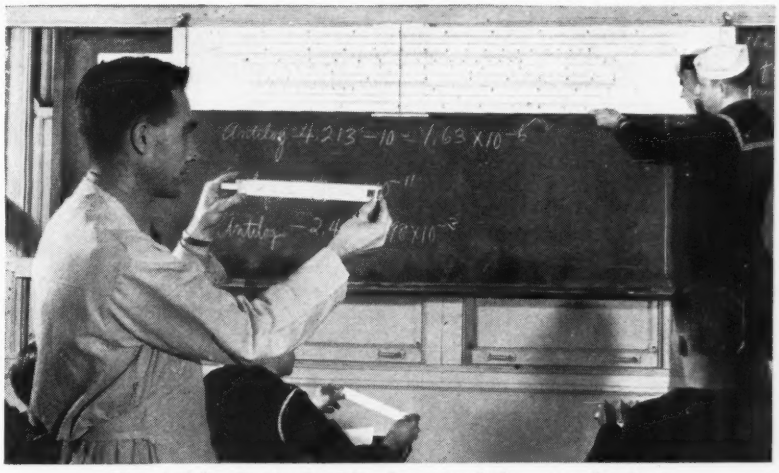
The pioneer artist, upon whom rested the responsibility of organizing the work, was Chief Specialist (X) Brander, who is now a lieutenant stationed at the Bureau of Personnel, Training Division, in Washington, D. C. By January, 1943, this department had grown to three staff artists and model makers who devoted their entire time to producing training aids for the rapidly expanding radio school. Today this department keeps 12 Navy men busy full time preparing the various materials for classroom instruction. A completely equipped workshop permits independent operation of the department. Many types of material are used in the construction of the models, including plastics, wood, plywood, sheet steel, and nonpriority material. The work of this department is now under the direction of Lt. (j.g.) A. L. Rogers, a peacetime radio amateur from Waukegan, Illinois.

In addition to the models used for training, the Navy is also a staunch champion of the efficacy of motion pictures and slidefilms in training operations. A Training Aids Library was set up at 1212 North Lake Shore Drive, Chicago, for the purpose of supplying films and projectors to supplement the visual aids.

By Navy contract, Burton Holmes Films, Inc., produced a 16mm sound movie in the laboratories of Radio Chicago entitled "Radio Technician Shop Practice." Upon completion of this standard 40-minute film, three more

(Continued on page 19)

Overall-view of the Visual-Aid Model Shop located at Radio Chicago, Chicago, Illinois. In this shop are built all the visual aids used to teach radio trainees.

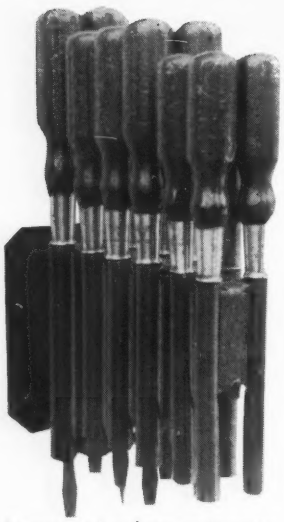


The principles of using the slide rule are taught by means of a giant model while students make computations on their individual rules. Chief Radio Technician E. J. Tripler of Montrose, Colorado, is instructing the class on the small slide rule while the model on the wall is being set by Charles Barrett, Specialist (X) 3/C, of DeLand, Florida, a member of the Visual-Aids Department of Radio Chicago.

Laboratory where students are building five-tube superheterodynes as one of their projects before graduation. Note the large scale model of the receiver mounted on the wall for the guidance of the students in placing parts.

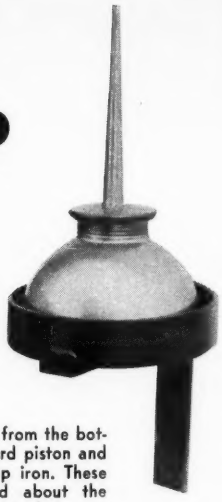
Welding Projects in the School Shop

BY *Lawson Miller*



Arrangement and compactness are no problem when screwdrivers are stored in the tool cabinet in this manner.

Welding equipment can be utilized in the school shop to fabricate time-saving and efficient devices which will aid the teacher immeasurably. Ingenuity and some scrap material are all that are necessary. Lawson Miller teaches general metal in the Eagle Rock High School, Los Angeles, California.

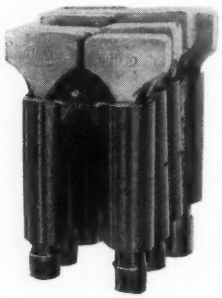


Oil-can holder made from the bottom of a Model T Ford piston and a bent piece of strap iron. These holders are mounted about the shop at convenient places.

TESTED 55 INSTRUCTIONAL PROJECT

THE time comes in the life of nearly every shop man when he must organize and equip a new shop. Too often the amount of money allotted beyond the actual equipment cost is limited. This means every short-cut has to be utilized to the fullest.

This article deals mainly with a high-school general metal shop, but comparable problems are found in the average automechanics, electrical, machine, and general shop. In fact, wherever men use tools, a well established system of storage and accessibility must be in effect.

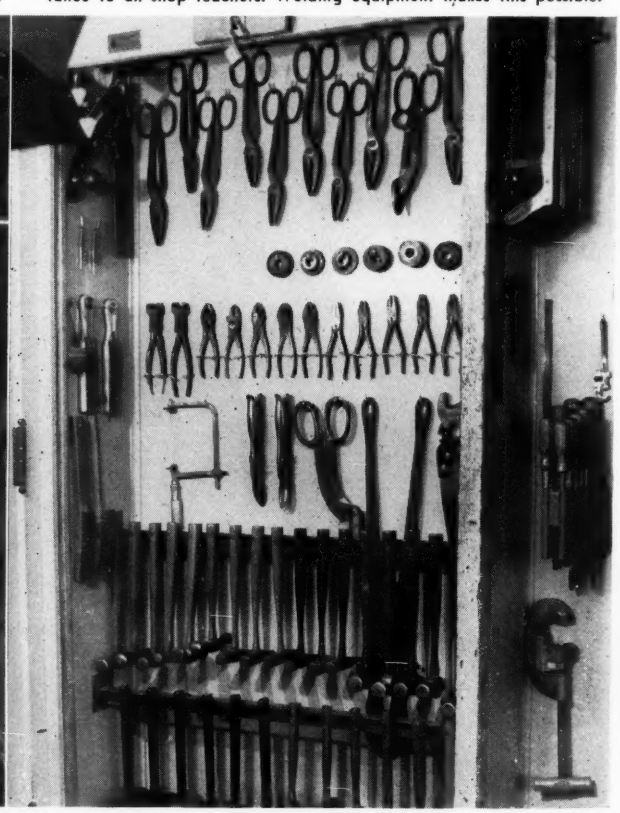


Excellent tool holders are made from pipe welded into a unit.

The shop shown in the accompanying photographs has been in hard use for seven years. Over a hundred students, from 13 to 18 years of age, attend this shop daily and not one tool holder has been replaced or repaired. Five or six classes are held each day in metal work,

Blowpipe tips are always accessible from the rack attached to a standard cylinder truck. The brick-top welding table was fabricated from scrap.

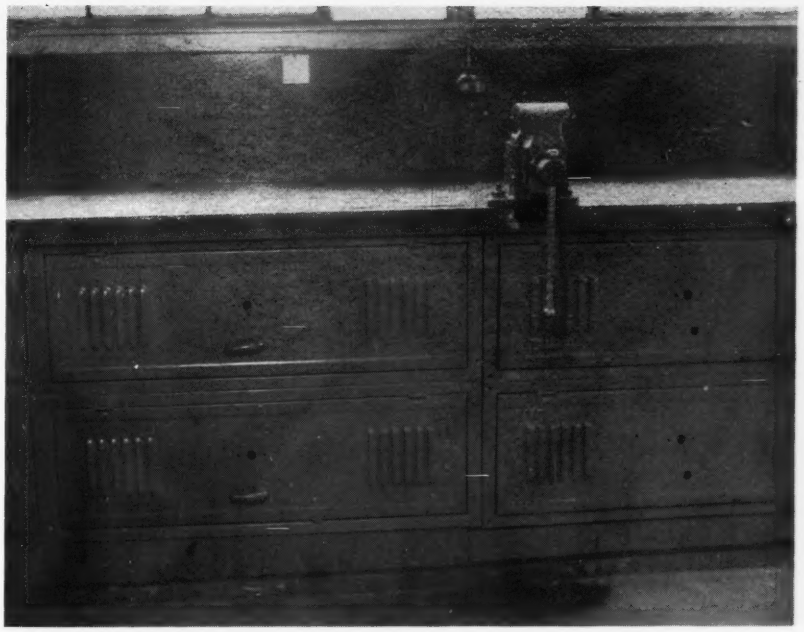
Durability and compactness with accessibility are of the greatest importance to all shop teachers. Welding equipment makes this possible.



so tools must be replaced and checked many, many times. The time allotted for clean-up and checking is five minutes. In the seven years under this expedited system, the tool loss has amounted to about $2.50 in value—a very low per-capita cost for the training of nearly two thousand young men and women.

Welding equipment within a school is absolutely indispensable. In organizing the shop and its tools, salvage materials from flag poles to baby carriages were used. In daily instructional use the welding equipment does double duty . . . practice welds and maintenance and repair for every department in the school.

During wartime when nonvocational schools were without high piorities, the welding facilities made it possible to salvage much otherwise useless material and turn it into teaching aids. The finished products made from such material were of a high standard and their fabrication rightly gave all students a feeling of accomplishment.



Old locker fronts are ideal for closing the space under a workbench. It adds storage space without creating a bad appearance.

Help Is at Hand—*in your own typecase*

A little ingenuity will go a long way in making instruction easier and more efficient. The learning aids described here are helpful to both teacher and student. Herbert Warfel teaches printing in the Joliet, Illinois, Township High School.

BY *Herbert Warfel*

TESTED 55 INSTRUCTIONAL PROJECT

IT was a printer who first publicized the truism that God helps those who help themselves; so it might not be too irreverent to hope for help from the same source for the printing teacher's problem of checking up each student's practice of newly learned operations, provided the teacher is willing to go halfway in providing his own aid.

The printing teacher can get a lot of selfhelp out of his own typecases or typesetting machine, if he will use the type for printing check sheets for the student to use when he first attempts newly acquired technics "on his own."

Better and briefer than a long-winded explanation are the examples in the adjoining columns. These check lists require no fancy typography. One font of lightface Roman is sufficient for a neat job.

They are printed on scrap card or document manila. One is given the student to relieve the teacher of having to remind him of "what to do next," as he goes through his first unsupervised performance of some new printing operation. The student checks each operation as he completes it. After the work is completed and checked, the card's work is done.

With this help from himself, the printing teacher will have a better claim for further help from sources beyond himself in more serious problems of which he has plenty.

PLATEN PRESS MAKEREADY

1. Ink the press with the right kind of ink—not too much.
2. Put in the form and LOOK AT THE GRIPPERS!!!!
3. See that your packing is very light.
4. Try an impression.
5. Add packing until you get a distinct impression on the drawsheet (tympan).
6. Put in the gauge pins (guides).
7. Wipe the drawsheet clean.
8. Make an impression on the stock.
9. Test for position, impression, inking.
10. Adjust gauge pins, packing, and ink.
11. Make impression on another sheet of stock. Test again for position, impression, and inking. Adjust gauge pins, packing, and ink.
12. And so on, until satisfactory.
13. "Set" the gauge pins.
14. Print another sheet of stock, and test for position to see that the pins were not moved in setting.
15. Clear the feed and delivery tables, and arrange stock conveniently.

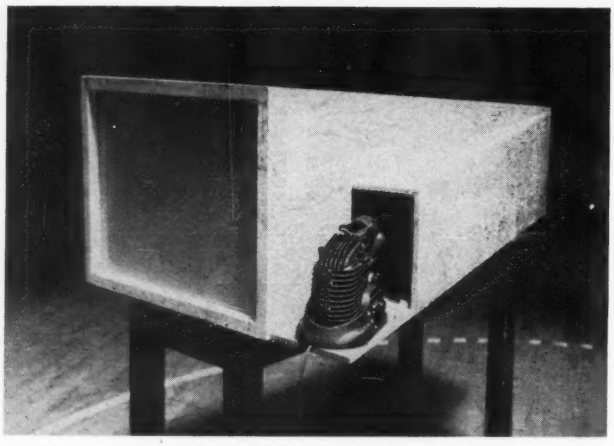
TO PUT A FORM ON THE KELLY PRESS

Check Here

1. Have delivery up, board and brush out. ☐
2. Wipe bed of press, and be sure chip-board strip is against ink-plate. ☐
3. Raise form on edge and wipe back of form. ☐
4. Hold form by ends and slide on bed of press, head or "guide-side" first. ☐
5. Push form firmly against chip-board at head and bed-bearer at feeder side of press. ☐
6. Loosen quoins. [Put key back in tool tray.] ☐
7. Put in cleat, tighten clamps, put key in tool tray, and tighten quoins with fingers. ☐
8. Plane down form. [Put plane in tool tray.] ☐
9. Tighten quoins with key. [Put key in tool tray.] ☐
10. Put in brush and board, and lower delivery. ☐

NEVER LAY ANYTHING ON THE BED OR THE TRACKS

Checked by_____



Portable Daylight Projection Device

This project was developed at the Army Air Force Technical School, Chanute Field, Illinois, and was found very effective for the utilization of motion pictures and slide films in the training program. The device has obvious applicability in school shops. SCHOOL SHOP is indebted to Colonel George W. Pardy, Chief, Training Aids Division, AAF, for the description of this device.

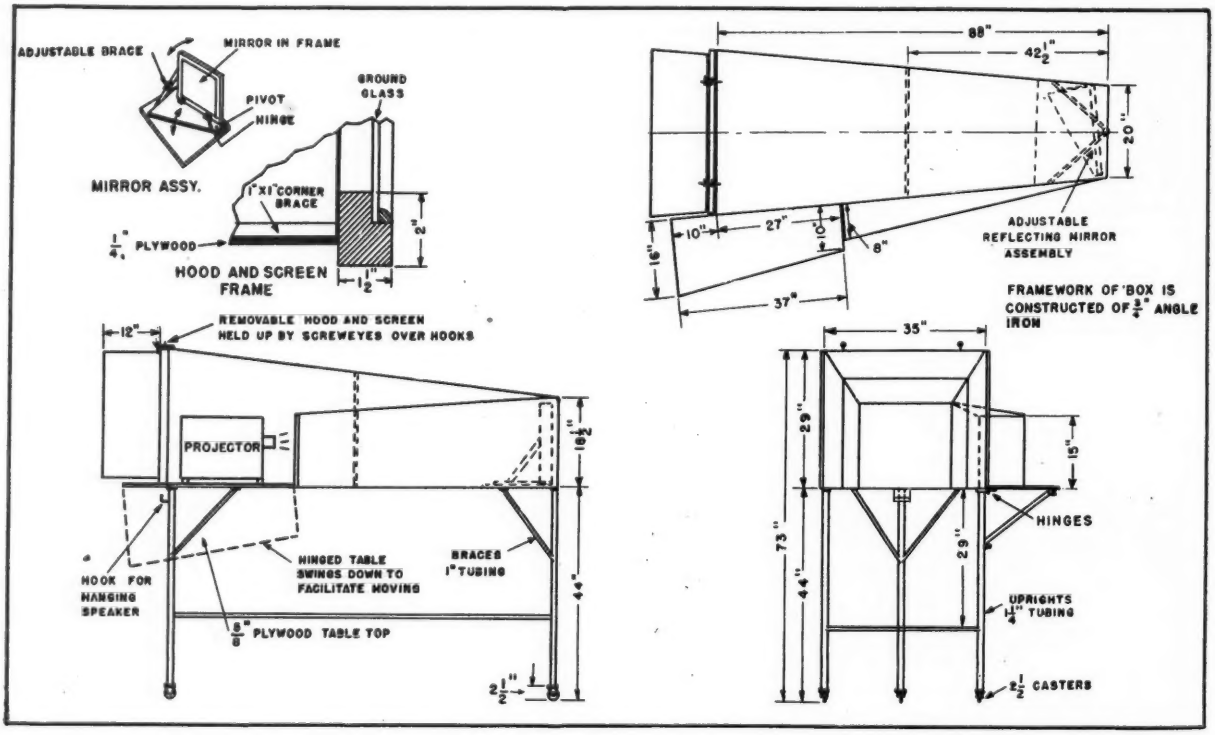
SHOP teachers wishing to use visual aids but handicapped by lack of proper facilities will find this device exceedingly helpful. By combining a hooded screen with a deflection mirror and projector stand, the designers have created a one-piece assembly which permits projection at close quarters, provides an ideal arrangement for projection before small groups in the shop, and partially overcomes the problem of projection under semidarkened conditions.

After the assembly has been constructed, all that is necessary to place it in operation is to position the projector at the point provided, focus the projector lens, and adjust the mirror. The device may be used with a 16mm motion-picture projector and with a 35mm film-slide projector. Supplementary lenses are not needed. Nor is it necessary to change the threading procedure for either type of projector; film is threaded through the machine in the usual manner.

The photograph on the front cover of this issue of SCHOOL SHOP shows an assembly as made from the working drawing below. The photograph above is of an assembly scaled down to a screen size of 25″ x 20″. The length of the assembly above is 64″ as contrasted with 88″ for that shown on the cover. As can be seen from these two models, the device can be designed almost any size to suit the requirements of the maker. The project is excellent for student construction and can be used to teach woodworking and the simple fundamentals of optics.

The interior of the assembly should be painted a dead black for best results. Care should also be exercised to secure a plate-glass mirror so that the image will not be distorted. The screen can be made of ground glass, opaque Plexiglass, or two sheets of window glass with tracing cloth between.

The best image is seen by standing 8 or 10 feet directly in front of the screen. The darker the room, the better the image, of course, although fairly good results can be obtained in a well lighted room even without a screen hood.



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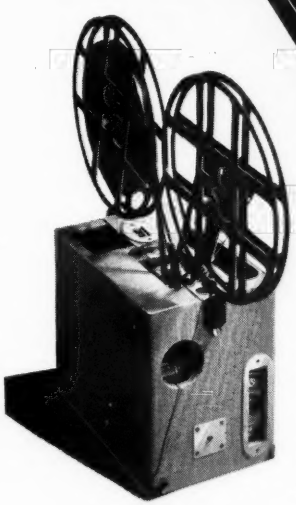

victor 16mm sound projectors

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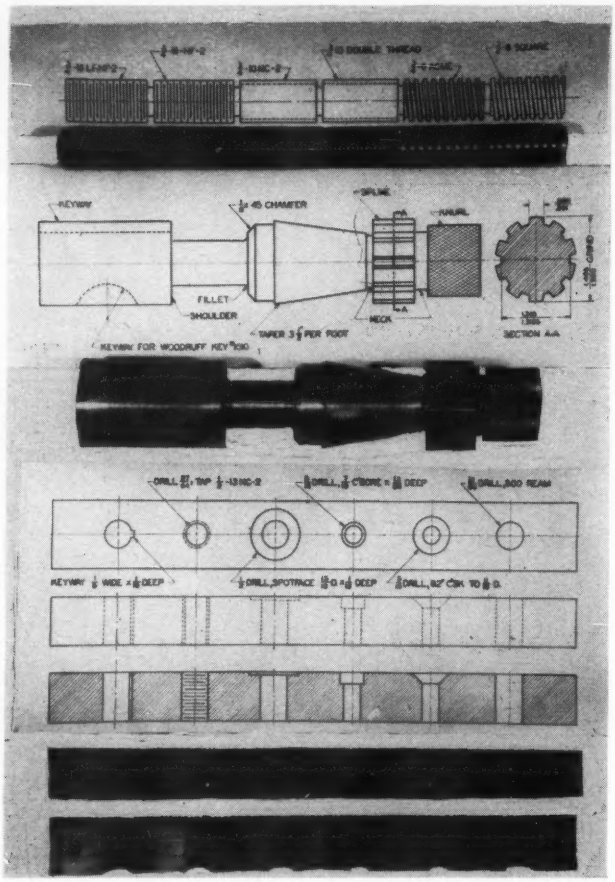
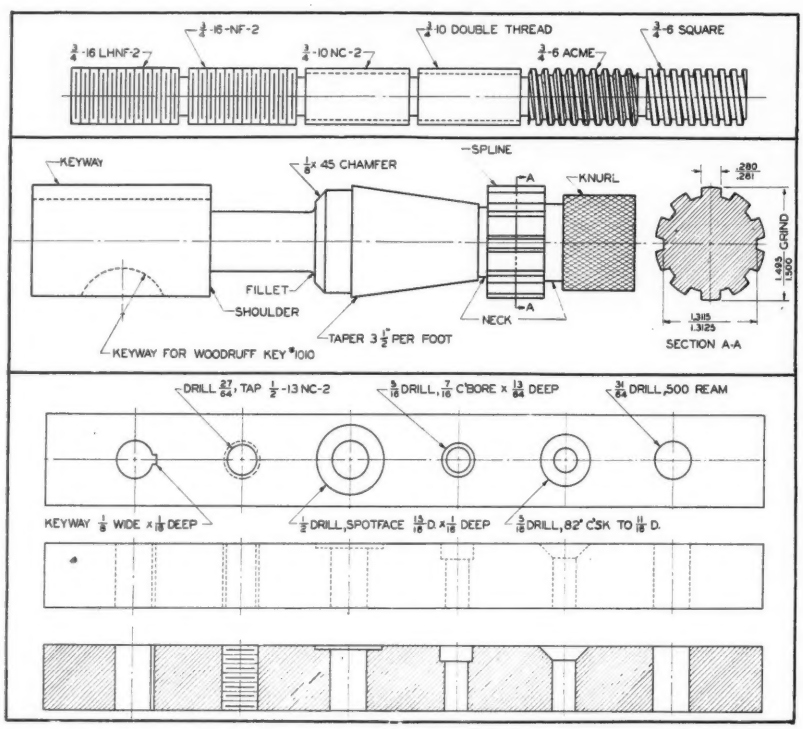
Drafting Symbols Easily Explained with Panel Board

BY *M. F. FOSS*





Teachers of drawing, blueprint reading, and machine shop will find this device helpful in aiding students to learn drafting conventions. The preparation of material for a board of this sort is an excellent student project. M. F. Foss is Assistant Professor of Industrial-Arts Education, Miami University, Oxford, Ohio

TESTED 35 PROJECT

DURING an adult blueprint-reading class an official of a gauge manufacturing concern asked, "What is a knurl?" In an effort to answer this and similar questions the following panel was developed. It has since been used successfully with both high-school and college drafting and blueprint-reading classes.

Many drafting and blueprint-reading students lack shop experience. Symbols and notes on drawings do not have meaning for them unless some such visual aid is used. The panel board may be used when some question arises about the interpretation of an abbreviation or note on a drawing. The student thus has an opportunity to form a working association between the drafting symbol, the appropriate note, and the machined part.

The first bar shows external threads —American standard fine, coarse, left hand, right hand, and double; also Acme and square. The second bar illustrates square and Woodruff keyways, shoulder, neck, chamfer, taper, spline, and knurl. The third bar is intended to show various operations which may be performed in a hole such as drill, keyway, tap, spotface, counterbore, countersink, and ream. Two bars are used on the panel; one shows the top view and the other is cut through to show the section. On the drawing there is a top view, elevation, and full section.

This might well be a student project as most instructors do not have time for such construction. It may be used in either the drawing room or machine shop.

Courtesy American Airlines Inc.

Mechanics performing a major overhaul on a commercial transport plane.

A School Shop Program in Aviation

These suggestions have been drawn up by the Industrial-Arts and Vocational Course in High Schools Division of the Illinois Committee on Aviation Education composed of E. J. Simon, Director of Vocational Education, Illinois State Department of Public Instruction, Chairman; Charles C. Bourland, Instructor of Aircraft Engines, West Frankfort Community High School; Warren E. Hill, Director, Chicago Vocational School; and A. B. Mays, Professor of Industrial Education, University of Illinois. This group has developed a realistic program which can be developed by communities, both large and small, which are interested in curricular offerings and course content geared to the air age.

SINCE education deals with the total of all our experiences, the interests of pupils tend to be general in their objectives until they have made a definite choice of their future vocations.

The secondary-school program must recognize both general and vocational education needs, with the greater emphasis given to general education in the early years of the secondary school and increasing emphasis to more specialized vocational training in the later years, but with no sharp break or division between the two. A student should explore the various possibilities in the school programs to discover the extent and character of his talents and to define his interests.

Industrial education in the school program is thus divided into two general phases—the industrial-arts or general education phase and the vocational-industrial phase.

1. **Industrial Arts.**—In this scientific age, it is imperative that every person have an insight into, and an appreciation of, modern industry and industrial life. Although many subjects of the secondary-school curriculum should play their part in giving prospective citizens a better understanding of the significance of industry in social and economic life, the main burden of providing experiences in industrial processes and imparting knowledge of industrial materials, products and problems must be carried by the industrial courses if youth is to be prepared adequately to deal with modern life. Just as physics and chemistry represent the world of science in the curriculum, industrial arts represent the world of industry.

The industrial-arts courses are an excellent medium for providing exploratory and try-out experiences which will enable the student to discover his interests, aptitudes, and capacities, thereby enabling him to make a more intelligent choice of his future life work.

Since the field of aviation is a vital and significant factor in our everyday living, the various industrial-arts offerings must include applications to aviation.

In those schools which are organized on the general-shop basis, the committee favors the substitution of the general aviation shop for the usual type of general shop if the teacher is qualified to handle the different aspects of aviation.

Where the junior high-school organization does not exist, the committee recommends that the general aviation shop be provided in the last years of the elementary schools.

In senior high schools equipped with unit shops, it is suggested that the industrial-arts courses be centered around aviation construction and repair, if the teachers are qualified to give adequate instruction.

It is also suggested that in the established shop courses in woodwork, sheet-metal, electricity, machine shop, auto-mechanics, and mechanical drawing the related material taught should include information concerning the aviation industry — transportation, manufacture, and related service occupations. Projects which involve the construction of parts of the airplane should also be included.

All industrial-arts courses should attempt to develop in each student an appreciation of good materials and workmanship, to instill desirable traits and attitudes, to produce intelligent consumer points of view, and to cultivate

some skills in the use of common tools. To accomplish all of these aims satisfactorily in the air age, much use should be made of subject matter from the field of aeronautics.

When the shop courses are built around aviation, these courses should be made a prerequisite to the private-pilot-license flying course. For those students who are definitely planning to become commercial pilots or flight engineers, such flight instruction should be considered vocational in nature.

The industrial-arts classes provide opportunities for concrete demonstrations of various aerodynamic principles. Pupils can construct aviation projects: model airplanes, small airports, even small airplanes that actually fly. Experimental equipment can be constructed to show pressure in a venturi tube or to demonstrate thrust. Studies can be made showing vocational possibilities. Basic aviation principles can be tested. Study can be made of the relations of air worthiness to design, types of wings, tail assembly, fuselage, and other parts.

Courses in woodworking can include such activities as construction of wing and fuselage structure, binding of wood, application of plywood, wing skins and patches, scale and flying model building.

Metalworking courses can include the layout, riveting, and fabrication of aluminum and its alloys, welding and brazing of tubing, repairs on metal wings, and the like. Electrical courses include simple wiring circuits, magnetism, theory of motors and generators, lighting, navigation or position lights, landing lights, and similar topics. Automechanics courses can well include the airplane power plant.

2. Vocational-Industrial Education.—The primary purpose of vocational-industrial education is to develop competence to perform successfully in an occupation.

The abilities and attitudes which are developed in both the general and vocational studies are applied in every vocational situation. All successful vocational education is as much concerned with the development of desirable social and vocational attitudes as with the development of skill and technical knowledge. A wise teacher recognizes the various aspects of the personality of the student that will affect his achievement and emphasizes the significance of the vocation in his social and economic life.

a) Criterions for the Establishment of Vocational Aviation Training Programs for Illinois.—Only cities in the state that can develop bonafide CAA approved schools for training licensed aviation and engine mechanics should be urged to develop programs now. We believe that it is much better to develop a few centers as soon as possible rather than to have several small centers with training set-ups which could not possibly meet CAA standards.

To obtain essential local interest and support would seem to involve securing adequate space, instructors, small tools, some special equipment, benches, storage cabinets, parts cabinets, material for "mock ups," and the like, as well as paying freight charges on engines, planes, and other equipment from the air depots to the local schools.

Proper understanding between the regional CAA representatives, the State Vocational Department, and the local school must be established, especially in regard to future development within the state. Such relations should promote the highest standards obtainable.

It is desirable to develop good school set-ups, especially in centers already offering vocational training in engine assembly or disassembly, etc.

Air service command training guides should be examined carefully with refer-

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ence to their use in all aviation and engine approved schools.

Cost will depend on the local community and will vary several thousand dollars.

[EDITOR'S NOTE: These Illinois criterions are equally applicable to other states.]

b) Factors to Be Considered When Locating Aviation Training Centers.—(1) Airline terminal. (2) Probability of private flying contracts with the training center. (3) Supervisory personnel now available. (4) Evidence that plans for training are under way. (5) Potential development of the city as an aviation center as revealed by CAA plans. (6) Potential trainee and employee supply. (7) Type of aviation training now in operation in the proposed training center. (8) Quality of local staff. (9) Attitude of local administrative staff.

c) Items of Help to Be Furnished Local Schools by State Vocational Departments.—(1) Suggested shop layouts. (2) List of equipment for each unit. (3) List of small tools for each unit. (4) List of "must" standards for certification by CAA: (*a*) Course outline of content built on shop analysis. (*b*) Teachers' certification — aviation and engine licenses with CAA instructor rating. (*c*) Building equipment to meet CAA minimum requirements. (*d*) Length of course to meet CAA minimum requirements. (*e*) Records to include progress of trainee—of work—overstock of equipment.

d) Units of Instruction.—

1. Engines: (*a*) Carburetor. (*b*) Generator—starter—magnetic. (*c*) Test and run up. (*d*) Engines.

2. Airplane: (*a*) Disassembly—assembly—rigging. (*b*) Sheetmetal. (*c*) Fabric and woodwork. (*d*) Dope and paint. (*e*) Hydraulic system. (*f*) Electrical installation. (*g*) Propeller. (*h*) Radio.

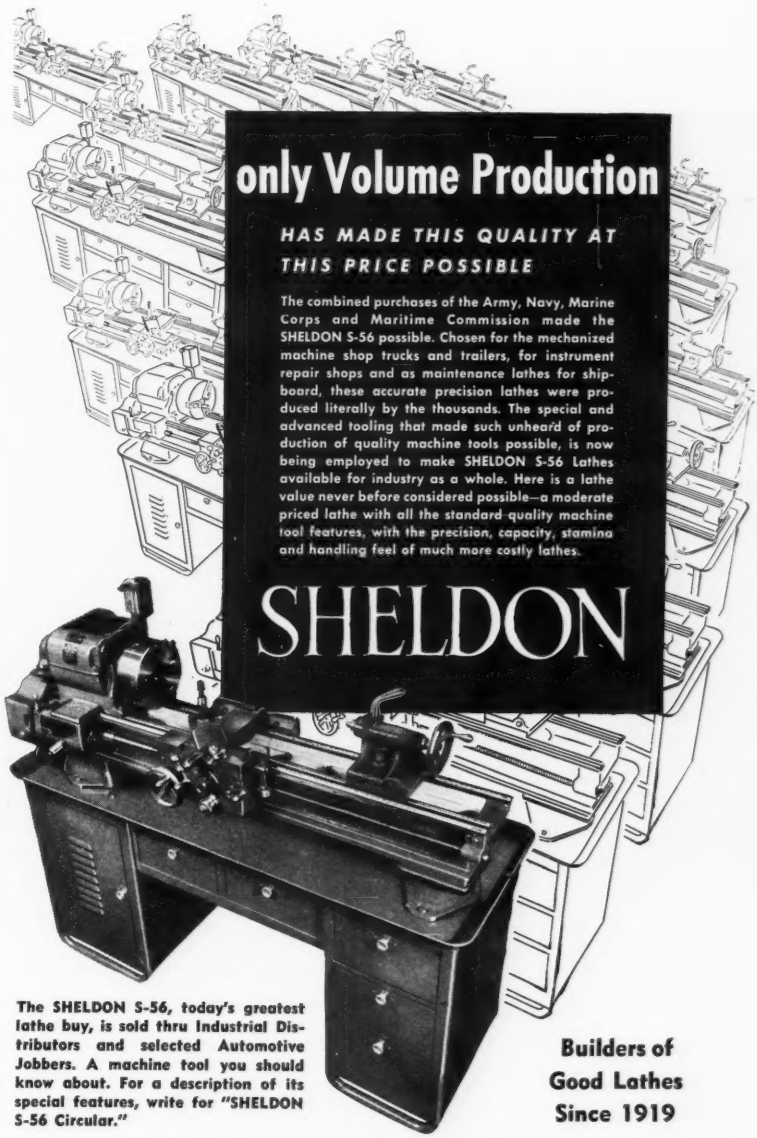
e) Entrance Qualifications. — Students should not be admitted to a vocational course unless they have made an occupational choice. Admittance should also be restricted to those who are physically and mentally competent to do the work and who possess the qualifications required for employment in the type of work for which training is offered. Prequisites for entrance should include one semester each of any two of the recommended industrial-arts courses in metalwork, automechanics, or machine shop; one semester in each of any two of the courses in mechanical drawing, woodwork, or electricity is required for those who wish to begin their vocational courses in the eleventh year. Additional preliminary shop training may be required of some students before beginning their vocational work in aviation.

Trainees should receive at least four hours per day shop work and instructors should not have more than 15 trainees at one time.

f) Types of Aircraft Mechanics Training.—The vocational courses in aviation mechanics should be offered in the eleventh, twelfth, and thirteenth years of high school.

Vocational courses for aircraft technicians, such as meteorologists, navigators, inspectors, airport managers, and traffic controlmen, would extend through the fourteenth year.

Some of the aircraft mechanics training courses to be offered should include training for the following occupations: aircraft woodworker, aircraft welder, aircraft fabric and finishing worker, aircraft sheetmetal worker, aircraft rigger, aircraft electrician, aircraft engine mechanic, aircraft engine electrical accessory mechanic, aircraft instrument mechanic.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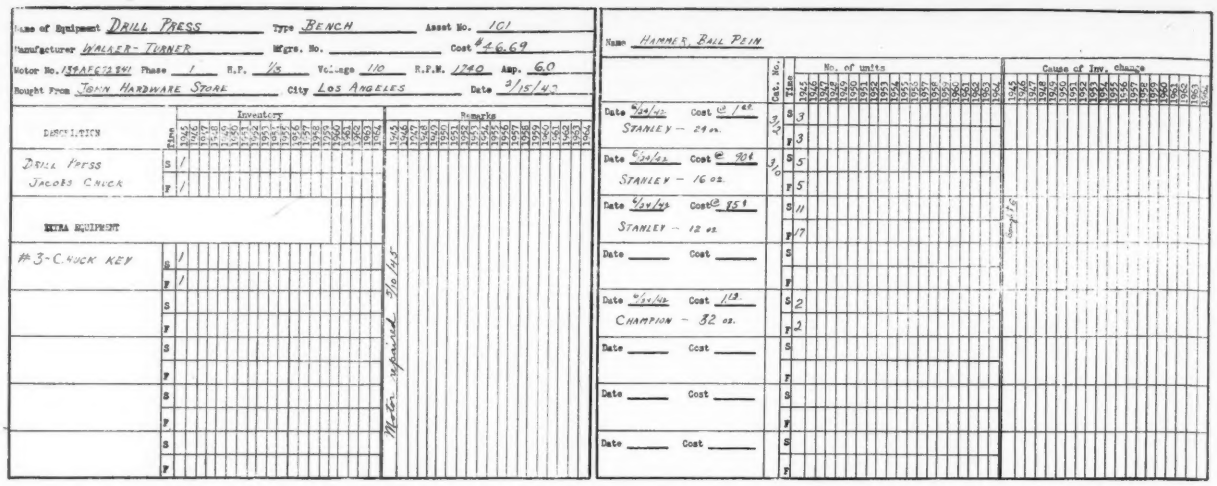
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Manufacturer WALKER-TURNER Mfgrs. No. Cost $46.69
Motor No. 38AFC3341 Phase 1 H.P. 1/3 Voltage 110 R.P.M. 1740 Amp. 6.0
Bought From JOHN HARDWARE STORE City LOS ANGELES Date 3/15/42
DESCRIPTION
DRILL PRESS
JACOBS CHUCK
EXTRA EQUIPMENT
#3-CHUCK KEY
Motor upgraded 3/10/45
Name HAMMER, BALL PEIN
Date 3/24/42 Cost @ 1.65 STANLEY – 24 oz.
Date 5/24/42 Cost @ 90¢ STANLEY – 16 oz.
Date 4/24/43 Cost @ 85¢ STANLEY – 12 oz.
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Date 5/24/42 Cost 1.15 CHAMPION – 32 oz.
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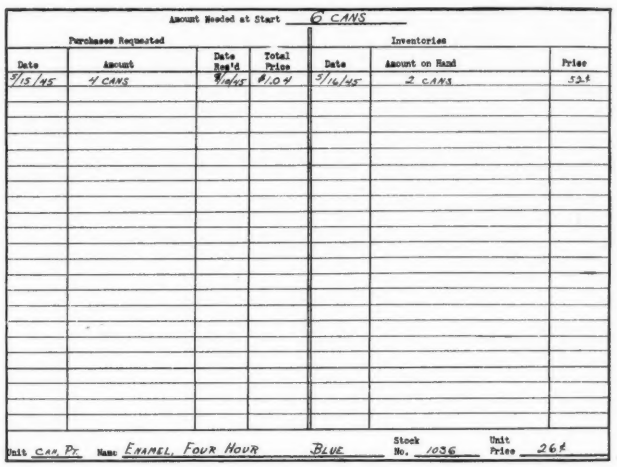
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Purchases Requested
Inventories
Date | Amount | Date Req'd | Total Price | Date | Amount on Hand | Price
3/15/45 | 4 CANS | 3/16/45 | 8.04 | 3/16/45 | 2 CANS | 52¢
Unit CAN, PT. Name ENAMEL, FOUR HOUR BLUE Stock No. 1036 Unit Price 26¢

A Time-Saving Inventory System

BY *Ralph E. Stucki*

Record-keeping and inventories, always time-consuming tasks for the shop teacher, are nevertheless essential to good administration. The problem is what records to keep for what future reference. The simple system developed by Ralph E. Stucki, Dana Junior High School, San Diego, California, keeps record-making to a minimum and provides a convenient reference file for inventories, reordering, and maintenance data.

Upper left—capital outlay form; upper right—tool form; and directly above—supply form.

A WELL-KEPT inventory is essential to the efficient administration of an industrial-arts department in any school system. Many shop instructors, now having inadequate systems, or none at all, might be persuaded to adopt a system that would make relatively simple the recording of articles, many of which must be reordered at least twice a year, and the accounting of items, which must be inventoried every spring and fall. A system which would make easy recording of the date and cost of each article received for requisition reference and that would serve also as a classified inventory would appeal to those shop instructors who find most inventory systems complicated and inconvenient.

The system here suggested requires only three forms—one for capital outlay, one for tools, and a third for supplies.

Each capital outlay piece of equipment is written on a separate sheet with such data as name of manufacturer, equipment information such as number and horsepower, and bookkeeping information, such as date purchased and cost. Additional space is provided for listing any extra appliance or equipment that might come with the machine.

Tools are classified under general headings, such as ball-pein hammers, snips, squares, etc., on a tool inventory form. The spaces below the general headings allow for the specific tool data, such as date purchased, cost, make, catalog number, and descriptive specifications.

The capital outlay form and the tool form provide for a spring and fall inventory for a 20-year period, all within the small space of an 8½" x 10" sheet of paper. In these columns should be placed the number of machines or tools on hand each spring and fall. The capital outlay form provides in addition adequate space for indicating condition of equipment, whether it had been repaired and on what date, etc., whereas the tool form provides space to indicate why there is a decrease or an increase in the quantity of any tool. Just as soon as a piece of machinery or tool is received, the information, held to a minimum is recorded on the proper form, thus obviating the necessity of ever having to record the item again.

The supply form is for indicating, when properly filled in, how much of any material is on hand. In the "purchase requested" spaces are to be recorded the date and amount of supply requisitioned. The date received is recorded to make easy quick checking of supplies ordered but not received. The recording of price is convenient for order reference as well as for comparative data. The right half of the sheet, headed "inventories," shows the date, the amount on hand, and the purchase price. By referring to the supply inventory before requisitioning for a new class, it is easier to order the material needed. The temptation to order more supplies than are needed for any year is overcome by the availability of data. The lower part of the sheet provides for informa-

tion on the unit on which the stock is based, the name of the material, the stock number in the school warehouse, and the price. With all supplies listed in this manner, there is little danger that any important material will be omitted from the order.

The writer finds that mimeographing or hectographing of the forms is adequate. Placed in loose-leaf notebooks, the filled-in forms are easily kept in alphabetical order. Glued index tabs will make the system even more quickly accessible for reference to materials, tools, and equipment.

AVA Convention
Buffalo, N. Y.
Feb. 6-9, 1946

ANNOUNCEMENT has been made by L. H. Dennis, Executive Secretary, that the convention of the American Vocational Association will be held at Buffalo, N.Y., February 6-9, 1946. Topics of importance to be discussed at the meeting include veterans retraining, reconversion training, pending federal vocational legislation, and new vocational programs.

All hotel reservations will be made through the AVA Convention Housing Bureau, c/o A. J. Morgan, Buffalo Convention Bureau, Buffalo, N.Y. Several hotels will be used. The commercial exhibits, the general meetings, and the AVA Executive Committee headquarters will be at the Hotel Statler. Individuals attending the convention are urged to room with one or more persons in order to conserve hotel space.

Radio . . . . . *from page 9*

16mm sound films and about 20 slidefilms (35mm) were produced in a similar manner under the supervision of Navy instructors at Radio Chicago.

Thus in several different forms, the Navy is making use of various time-saving visual aids in the instruction of their radio technicians.

It seems certain that in the postwar era, schools and colleges will be quick to take advantage of what the Navy has learned laboriously. When students from all walks of life are brought together to learn the intricacies of any science or abstract subject, new and disassociated ideas must be presented to them in a simplified, easily grasped manner if utmost speed of instruction and intelligent comprehension is to be obtained.

Visual aids have proved to be the ideal medium to achieve this end, for it is this method that has enabled Radio Chicago to prepare untrained naval personnel for the exacting task of maintaining the complex electronic equipment which is the voice, eyes, and ears of the U. S. Navy.

WAR HAS PROVED THE EFFECTIVENESS AND ECONOMY OF REPAIRING CRACKED ENGINES

Now, NO ENGINE REPAIR COURSE IS COMPLETE WITHOUT THE

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" . . . There is no record of a repair failing as a result of time or mileage." So states ODT Report 5-1120 about engine cracks repaired by the K & W Mechanical Method. The K & W Method employs no heat . . . is a cold mechanical repair for heat, freeze or stress cracks that is GUARANTEED to restore practically any cracked automotive and diesel engine to unimpaired service. It is now standard practice with hundreds of fleet operators, engine rebuilders and engine makers' service branches.

NO ADDITIONAL SHOP EQUIPMENT NECESSARY

Tools required to make K & W Mechanical repairs are the type of portable power tools that are standard equipment in most school shops.

INFORMATION AND TRAINING

Complete information on the K & W Mechanical Method will be furnished you; or we will train your instructors without charge.

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HANDEE
IS THE PRIZE GIFT
Give a Handee this year to your son, dad, friend—give one to yourself! It's not only a tool, it's a hobby, a new outlook! Satisfy that urge to create. Know the thrill of turning out professional-looking projects. With the HANDEE you can make beautiful gifts or things to sell—ship, train and plane models, costume jewelry, wood carvings, puppets, initialed tumblers, engraved trays—articles of every description.
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Make Things From—
WOOD ★ PLASTICS
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A tool shop in your hand! The original hand tool and today's finest, HANDEE grinds, drills, cuts, carves, cleans, sands, saws, sharpens, engraves. You'll like its speed, its smooth performance. Perfectly balanced, fits your hand—it's fascinating, modern! Wt. 12 oz. AC or DC. 25,000 r.p.m.

Postpaid with 7 accessories $18.50

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HANDEE Tool and 45 most popular accessories, in handsome, compact, steel carrying case! Set includes steel cutter, drills, bristle brushes, polishing wheels and points, rubber disc, drum sander and bands, mounted wheels, Speed Oil, sandpaper discs. You'll be amazed at what you can accomplish! Complete, postpaid $25.00.

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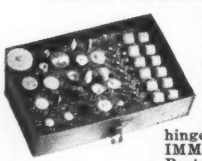

Tool owners have been wanting it for years! Sensational assortment of finest quality, time-tested accessories for use on any portable tool; packed in a steel, hinged-top carrying case. IMMEDIATE DELIVERY. Postpaid $25.00.

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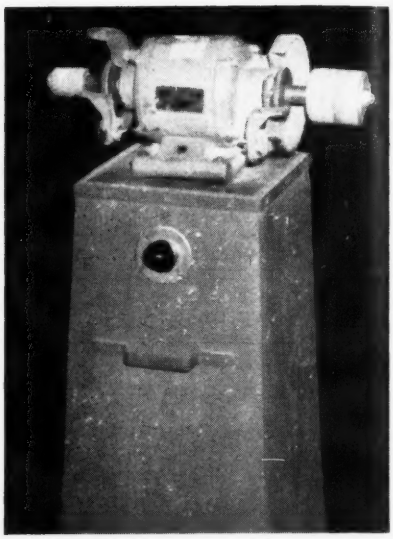
Practical Drum Sander

BY *G. H. Billingham*

A little imagination on the part of the teacher can result in the construction by students of some useful equipment for the shop at a very nominal cost. G. H. Billingham is Supervisor of Industrial Arts, Public Schools, Weehawken, New Jersey.



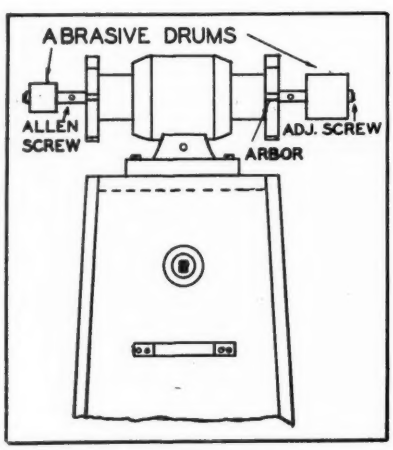
TESTED INSTRUCTIONAL PROJECT

THE use of hand abrasives on curved surfaces is tiresome and sometimes unsatisfactory. On the other hand, power sanding cuts abrasive costs, increases student interest, and teaches modern methods.

This portable drum sanding unit consists of a base and a motor with two different-sized drums. The drums, ready for fastening to the motor arbor with an Allen wrench, can be purchased at surprisingly low cost. Sanding sleeves of various grades of grits are also available. It should be remembered that these sleeves can be entirely used up before needing replacement.

We had no trouble in securing a used ¼ H. P., 3500 R. P. M. motor and, with reconversion now a reality, more low-horsepower units will be available at attractive prices. Total cost of the completed unit is surprisingly small.

The base does not need toe space due to the drum overhang and general shape. The switch is placed in an accessible position and handles at front and back facilitate moving the unit where needed. If desirable, cabinet space for buffing equipment (which can be readily attached in place of the drums), extra sleeves, wrenches, etc., can easily be built in—remembering that this is a portable unit and compartments, if any, should be designed accordingly.



Portability is a feature that proves its value for either short pieces or long work where placement is important. Also, sanding should not be done near metalworking equipment unless the latter is well covered.

Make the base heavy enough to support the unit and keep it "as put" by inserting a thick piece of wood in the bottom.

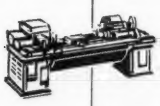
Screw the parts together and paint in harmony with other shop units. Strap iron makes a neat trim, but a short piece of aluminum edging will add to its appearance. Make the joint on the back. (A small piece of linoleum can be glued to the top before installing the motor.)

The knack of power sanding can soon be acquired. Practice with scrap pieces, using various pressures and continuous motion while in contact with the abrasive. It is not advisable to attempt to sand straight surfaces on a drum sander of this type, but this operation can be accomplished on short pieces with a little practice. If necessary, a jig can be arranged to aid in this latter process.

The addition of this shop-prepared machine will increase the use of your band or jigsaw, as less time will be needed to finish the contours which these saws can produce.

The stock used is as follows: The side panels are ½″ stock 36½″ long, tapered from 15″ at the bottom to 11½″ at the top. The front and back panels are also ½″ stock 36½″ long, tapered from 14″ at the bottom to 10½″ at the top. The base is 2″ stock, 14″ square. The top is ⅞″ material, 10½″ square.

IF YOU HAVE A LATHE



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Grinding

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With a Dumore mounted on your present lathe, or other standard machine tool, you are ready at once to teach cylindrical (internal and external), surface, and thread grinding. And you will have a real production tool, a *precision* tool accurate to .0001", a tool that is vibrationless in operation and ruggedly built for years of dependable service. You will make your instruction easier and provide your students with the very best of modern equipment—all at an extremely modest investment! Write for Catalog 42. The Dumore Company, Tool Division, Dept. TL-38, Racine, Wisconsin.

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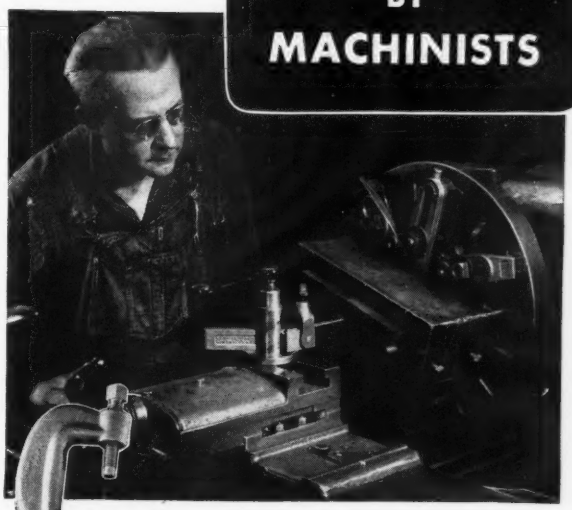
PRECISION AND HAND GRINDERS

Sold By Authorized Industrial Distributors In All Principal Cities

Preferred BY MACHINISTS



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● Experienced machinists prefer Williams Tools because they help produce *better* work *easier!*

After more than a half century of daily use, industry has found these fine tools not only well designed and accurately machined, but rugged and long-lasting. There are no better tools with which to train the machinists of tomorrow.

Write Dept. S-1245 for Williams Machinists' Tool book and for copies of the Data Sheets, listed below, which interest you.

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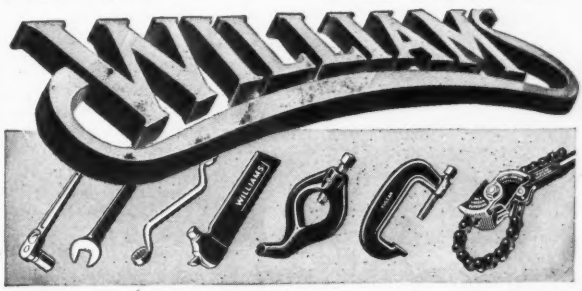
Free DATA SHEETS

Mailed postpaid on request — Order by number.

1. Data on "Superior" Wrenches.
2. Data on Boring Tools.
3. Data on Chain Pipe Tongs.
4. Data on "Supersocket" Wrenches.
5. Data on Lathe Dogs.
6. Data on Chain Pipe Vises.
7. Data on Turning Tools.
8. Types of "Superior" Wrenches.
9. Use of "Supersocket" Wrenches.
10. Data on Eye Bolts.
11. Data on "C" Clamps.
12. Use of Cutting-Off Tools.
13. Use of Knurling Tools.
14. External Thread Cutting.
15. Internal Thread Cutting.
16 to 21. Six Data Sheets on grinding cutters for Tool Holders.
22. Use of Open-end Wrenches.
23. Use of Lathe Dogs.
24. Use of Socket Wrenches.



Fellowcrafters Announce Design Contest

Fellowcrafters, in order to encourage originality and interest in industrial design and promote its creation, have just announced an island design contest.

Any student in any art or industrial-arts class in any public, private, or parochial school (7th to 12th grades) is eligible. Design motifs must have their source in the island arts of the Pacific area and are to be so arranged as to be executed in a specific crafts medium.

Full details of the contest appear in the newspaper, *The Fellowcrafter,* copies of which may be obtained by writing Fellowcrafters, Inc., 130 Clarendon St., Boston 16, Massachusetts, *or by checking no. 27 on the coupon below.* Also, see page 28.

New South Bend 9-inch Lathe Catalog

South Bend Lathe Works' newest Catalog 9-G, just off the press, illustrates in full color and completely describes its line of 9-inch engine lathes and toolroom lathes. Also shown are its 9-inch precision turret lathes which have ½-inch collet capacity. Lathe tools, accessories, motors and controls and attachments for special classes of work are illustrated and described in detail.

A copy of this 36-page catalog 9-G will be mailed to you upon request by addressing South Bend Lathe Works, 181 E. Madison Street, South Bend 22, Indiana, *or checking no. 28 on the coupon.*

Each item listed above is numbered. Check the numbers of the items you want, and mail the coupon, properly filled in, to . . .

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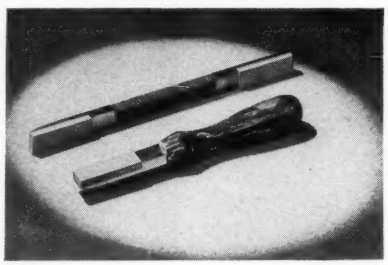
New Pocket-Size Hand Hones



Bay State Abrasive announces two new vitrified diamond hand hones which are exceptionally useful for touching up carbide tools before they become too dull.

Two pocket-size models are available with a diamond section 7/16" wide by 1" and 1½" long with 1/16" depth of diamonds. Both styles are supplied with plastic handles, and each is furnished in a handy leather case. One model has a hone at both ends, the other a hone at one end.

For further information and prices, write Bay State Abrasive Products Co., Westboro, Massachusetts, *or check no. 29 on the coupon.*

Plomb Announces New Wrench

A new flare nut wrench for use on plastic pipe, tubing, and soft metal fittings is announced by the Plomb Tool Company.

The head is flat, based on a modified 12-point design, with an opening which allows access to fittings around tubing. These features, coupled with deep, thin walls, permit use in close spaces and small turning arcs. The primary uses of the flare nut wrench are in the assembly of all types of lines, including fluid, air, gas, etc. Complete information is available from Plomb Tool Company, 2209 Santa Fe Avenue, Los Angeles 54, California; *or check no. 30 on the coupon.*

Behr-Manning Offers Revised Chart and Bulletin

A revised metal-finishing chart showing sample product swatches is offered to shop instructors and supervisors by Behr-Manning. The chart emphasizes "Durabonded Metalite" products, Behr-Manning's latest contribution toward perfect coated abrasives. Also offered is an informative bulletin on idler backstands, one of the most important application methods ever developed in the use of coated abrasives.

For a free copy of both the chart and bulletin, write Behr-Manning Corporation, Troy, New York; *or check no. 31 on the coupon.*

The Amazing Electron

The Electronic Corporation of America has announced the publication of an illustrated booklet, *The Amazing Electron,* which is available to educational leaders, teachers, and students.

Profusely illustrated in cartoon technic and simply written, the booklet makes clear the composition of the atom, the historical development of electronic science, and explains its application in radio (including F.M.), television, medicine, and industry.

This is the second in a series of booklets put out by ECA Radio. Individual copies are free. There is a five-cent handling charge in quantities of 20 copies or more. Write Electronic Corporation of America, 45 West 18th St., New York 11, N. Y.; *or check no. 32 on the coupon.*

Ohmite Offers Interesting Manual

Resistance problems and their solutions are interestingly covered with the Ohmite Catalog and Engineering Manual No. 40. The 96-page manual begins with a section on selecting resistors. Another section covers the subject of determining the resistance and current in a specific circuit. This section contains two large alignment charts, one for solving Ohm's Law problems, the other for determining parallel resistance. Many tables and a great deal of engineering information is offered in each section.

For a free copy of this manual, write the Ohmite Manufacturing Company, 4935 Flournoy St., Chicago 44, Illinois *or check no. 33 on the coupon.*

New Literature

Plastic Crafts, an informative booklet on the use of plastics in school craft work, is offered free of charge to handicraft and shop instructors. Write Craft Shop, 124 Ford Avenue, Wyandotte, Michigan; *or check no. 34 on the coupon.*

CMA 10, a 16-page catalog, contains excellent illustrations and detailed explanations covering the outstanding features, operating data, applications and setups of the recently announced Model C Milwaukee Autometric Boring Machine. Copies upon request from Kearney and Trecker Products Corporation, Milwaukee 14, Wisconsin; *or by checking no. 35 on the coupon.*

Radial Power Saws and their many uses are informatively described in the new technical manual, *How to Operate and Maintain the DeWalt Saw.* Divided into two sections. The first explains the three radial movements of the saw and how they are quickly mastered as well as 24 different popular operations. The second section introduces and explains the simple mechanical adjustments that control and maintain accuracy of every setting. Copies are available without charge from DeWalt Products Corporation, Fountain Avenue, Lancaster, Pa.; *or check no. 36 on the coupon.*

A new underwater arc-oxygen cutting torch and kit are completely described in circular No. 610, just released by Palmgren Products. For a free copy write Chicago Tool and Engineering Co., 8383 S. Chicago Ave., Chicago 17, Illinois; *or check no. 37 on the coupon.*

The Meissner Student Instruction Plan, a booklet which will help teachers to more effectively plan their radio courses, is available without charge from Meissner Manufacturing Corporation, Mt. Carmel, Illinois; *or by checking no. 38 on the coupon.*

Opportunity is Knocking for Schools As Well as Trainees

THE big GI Program offers schools—as well as returning servicemen and women, and civilians who have been in war work—a big opportunity for development.

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Brodhead-Garrett will supply you with the modern equipment, machines and supplies you need to take full advantage of putting your training department on a big scale basis—even help you plan such a department (if you haven't one), or help you enlarge your present department to the size your requirements call for—if you'll just give us the opportunity. For as long-standing headquarters for the needs of America's schools in training equipment, machines and supplies, Brodhead-Garrett has the "know how" and equipment for helping any school to establish, enlarge or modernize their training departments.

Consult your B-G Catalog now—and order what you need, today—keeping in mind that an order for **all** your requirements—at one time—eliminates duplicated routine and helps us as well as you.

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Do the job right . . . with the right tools: made by GREENLEE! Sharp, fast, clean-cutting, *long-lived* edges. Highest quality materials throughout combined with accurate over-all design for highest efficiency and durability. Truly, tools for the craftsman, built by true craftsmen.

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Write today for information on any or all of the above high-quality GREENLEE tools. Greenlee Tool Co., Division of Greenlee Bros. & Co., 2052 Twelfth Street, Rockford, Ill.

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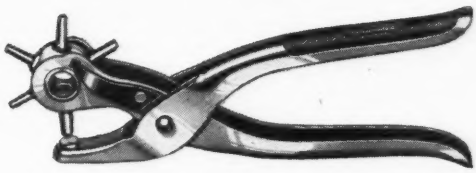

BERNARD SPRING BELT PUNCH with revolving head and drive tubes. For years, the standard tool in leather-craft. Widely used in veteran rehabilitation work. Replacement drive tubes in 9 sizes.

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Sirs: Please send me your catalogue of pliers, nippers, punches, and other specialized tools suitable for the industrial classroom.

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Instructional RESOURCES

Selecting an Occupation. (Revised Edition) Prosser. Bloomington, Illinois: McKnight & McKnight, 1945. Pp. 154. $0.60.

This book provides helpful information, advice, and directions for those of either sex who want to make a more careful and intelligent choice of their life work. Nine major occupational fields are covered: agriculture, clerical, domestic, manufacturing, mining, professions, public service, trade, and transportation and communication. The revised edition contains new charts and information on the latest developments in these fields. It is accompanied by a practice book which suggests applications of the data learned.

The material presented can be used effectively for both group and individual instruction. The plan of treatment is based on the principle of learning by doing; participating experience is insured. Extensive appendices are included.

C. A. Prosser is the retired director of the William Hood Dunwoody Institute, Minneapolis, Minnesota.

Unit Course in Arc Welding. California: State Department of Education, 1945. Pp. vi + 142. $1.25 single copy; $1.15 per copy on orders of 10 or more.

A recent addition to a series of manuals prepared by the Bureau of Trade and Industrial Education in the war-production training program of shipworkers of California.

This manual is written to be used by the average worker; consequently, explanations are simple, and technical language has been avoided wherever possible. Contains general fundamental information pertinent to the trade and a series of practice lessons that will serve as a valuable guide to trainees and welding operators. Instructors in arc welding will find the manual useful in teaching the craft.

Contents include general history of welding; welding theory; welding circuits; machine adjustment; equipment; safety precautions; health aspects; materials; arc analysis; rod angles and manipulations, positional aids; practice lessons; tacking; and appendix.

Blackboard Illustration. Perry. Peoria, Ill.: Manual Arts Press, 1945. Pp. 48. $1.00.

In an attempt to upgrade shop teachers in the technic of blackboard illustration, a course in "Blackboard Illustration for Shop Teachers" was offered at the Rhode Island College of Education. This course, plus subsequent courses, proved so satisfactory that they are now incorporated in the state industrial teacher-training curriculum. This teacher-trainer text embodies the results of these courses.

The table of contents includes full descriptions and illustrations in the use of the blackboard during the shop talk. Divided into fifteen units, on such phases as the diagram; pictorial drawing, prisms and cylinders; perspective drawing; diagonals; lettering; exploded drawing; drawing and talking, etc.

Although prepared primarily for the shop teacher, this text is of equal value to teachers of science and of any other subject where the teacher makes use of the blackboard as an aid in demonstration.

Raymond W. Perry is a teacher trainer and supervisor of industrial education, Rhode Island.

Visualized Projects in Woodworking. Sowers. New York: McGraw-Hill Book Company, Inc., 1945. Pp. 89. $1.60.

The text material in this book gives in visual form a course of individualized construction in woodwork. This is a workbook—a book of plans, projects, and work processes. There is no discussion of tools, wood finishing, lumbering, etc. The projects are easy to understand and carry out, because the finished product and each step in its construction and completion can be seen at the beginning. Instruction sheets accompany all projects.

The book is equally suitable for junior and senior high-school students, for mixed grades, and for rehabilitation training.

John I. Sowers was the late director of industrial-arts education in the public schools of Miami, Florida.

The Home Mechanic's Handbook. DiBernardo, Haines, Adams, Van Tassel, Thompson, Miller, Bailey, Nowak. New York: D. Van Nostrand Company, Inc., 1945. Pp. 816. $5.95.

Designed for the home craftsman, this manual describes in complete detail the tools, materials, and procedures necessary to do innumerable jobs about the home and in the home workshop. Each step in the use of all the tools is shown by means of "hands-at-work" illustrations, with step-by-step procedures described in order to obtain the best results from hundreds of large and small jobs. Divided into six sections, the book includes material on painting and decorating, woodworking, metalworking, plumbing, masonry, and electrical work.

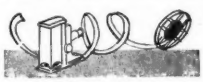
D. Joseph DiBernardo is an instructor in the School of Industrial Art, New York City; John F. Nowak is a senior teacher in the war-industries training program; Kenneth H. Bailey is a registered architect; Roy E. Haines, John V. Adams, Raymond Van Tassel, Robert L. Thompson, and John G. Miller are staff members in the department of vocational education at New York University.

Teacher's Manual. Moseley. New York: Cornell Maritime Press, 1943. Pp. x + 210. $2.00.

For many men, turning from industry to the teaching profession, this manual will help break the common ground between vocational skill and teaching skill. The manual starts with the primary requirements of the instructor and the trainee: What must the teacher bring as his personal equipment? What are the conditions under which he operates? How do students learn? Why do they forget? The various methods of teaching—the lecture, the demonstration, the recitation, the discussion—are considered in the light of the actual conditions of the shop, the laboratory, the field.

The second part of the manual contains an analysis of problems, tests, drilling, and classroom equipment. The procedures of studying, the technic of handling students, the difficulties of the first class—all are dealt with. Special problems in industrial manpower training programs are considered.

Nicholas Moseley is a lieutenant commander in the United States Coast Guard Reserve.



DeVry Film Catalog, 1945-46, is now available. 76 pages of titles and data, plus a 20-page supplement of films newly added to the DeVry Film library. All films listed are 16mm sound and silent classroom teaching films. For free copy write DeVry Film & Laboratories, 1111 Armitage Ave., Chicago 14, Illinois. *Please mention* SCHOOL SHOP.

Plexiglas. An interesting 16mm sound film showing methods of Plexiglas fabrication, maintenance, and repair. Free showing available to shop instructors. Write Plastics Department, School Division, Rohm and Haas Company, Washington Square, Philadelphia 5, Pa. *Please mention* SCHOOL SHOP.

Film utilization scope chart. 18th edition. A grouping of Encyclopaedia Britannica classroom films in their subject matter areas cross-indexed with their primary and secondary correlations. For free copy write Encyclopaedia Britannica Films, Inc., Chicago 6, Ill. *Please mention* SCHOOL SHOP.

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NEWS

What's Doing in the Field of INDUSTRIAL EDUCATION

School for Veterans

A SCHOOL has been established for veterans at Troy, N. Y., by the New York State Board of Regents after the withdrawal of funds for war-training courses by the federal government caused the discontinuance of the school. Veterans Administration funds will help in operating the school under the new set-up which includes the offering of one-year courses of a vocational nature.

Rochester Expanding

AN expansion program has been announced by Rochester Institute of Technology which will involve the expenditure of $2,220,000. Included are plans for the immediate construction of a $700,000 building to be named in honor of George H. Clark, treasurer of the Institute.

New Handbook

THE National Council of Technical Schools has just released for circulation the 1945 edition of its *Handbook of Approved Technical Institutes.* This handbook was prepared to meet the many requests that were coming from veteran advisory agencies and high-school vocational-guidance instructors seeking authentic information about approved courses of the technical-institute type. The first part of the handbook is devoted to a discussion of the place and function of the technical-institute type of educational institutions and the second part to double-page spreads devoted to each of the various technical institutes that have been inspected and approved by the council to date. Copies are avail-

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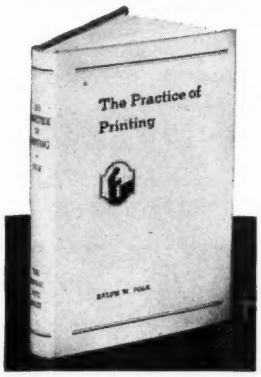

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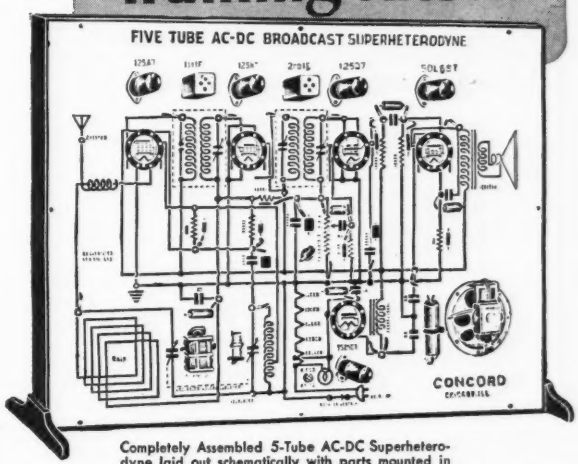

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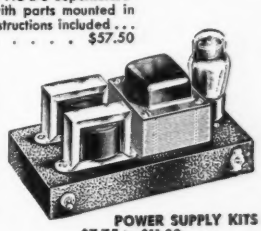

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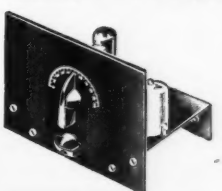

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A RECENT change in Selective Service regulations makes it possible for students regularly enrolled in high school to postpone induction into the Armed Forces. The new regulations are as follows: (*a*) Any person 18 or 19 years of age who, while pursuing a course of instruction at a high school or similar institution of learning, is ordered to report for induction during the last half of one of his academic years at such school or institution, shall, on his request, have his induction postponed until the end of such academic year, without regard to the date during the calendar year on which such academic year ends, or until he ceases to pursue such course of instruction, whichever is earlier. (*b*) Any person who enters a course of instruction at a high school or similar institution of learning before he becomes 18 years of age and who is ordered to report for induction during the time he is pursuing such course of instruction, shall, on his request, have his induction postponed (1) until his graduation from a high school or similar institution of learning, or (2) until he ceases to pursue continuously and satisfactorily such course of instruction, or (3) until he arrives at the age of 20 years, whichever is the earlier.

From Washington *from page 32*

from $7 to $5 million; for office occupations, from $5 to $4 million; for vocational guidance from $4 to $3 million; for public service occupations, from $2 to $1½ million. The proposed $500,000 for industrial arts is unaffected by the Barden Bill.

» "Never before have so many persons been counselled by so many counsellors on so many vocational interests." This might well describe a trend gaining in importance daily. The Veterans Administration is operating 200 veterans' advisement centers, is keeping them staffed with top-notch counsellors, and is supplying them with up-to-date facts on labor market conditions, job-getting, and training opportunities. In addition, counselling service to veterans is offered at all regular Veterans Administration offices and by the 1500 U.S. Employment Service field stations.

GEORGE FERN, director of civilian training for the War Department, Washington, D.C., will become managing editor of the *American Vocational Journal*, succeeding WILLIAM D. BOUTWELL who will join Scholastic Magazines in New York City. . . . VERNE C. FRYKLUND, formerly of the University of Minnesota and more recently a lieutenant colonel in the Army Air Corps, has been named president of Stout Institute, Menomonie, Wis. . . . VERD PETERSON, state supervisor of agricultural education for South Carolina, has been appointed state director of vocational education. . . . RALPH WOODS, state director of vocational education for Kentucky, has been appointed president of Murray, Kentucky, State Teachers College, succeeding the late JAMES H. RICHMOND. . . . WILLIAM E. BRUNTON has succeeded ROBERT H. KREWSON as principal of the Edward Bok Vocational School, Philadelphia. . . . FREDERICK W. ZIEGENHAGEN, vice-principal, has been named principal of the Boys' Trade and Technical High School, Milwaukee, on the retirement of THOMAS G. BROWN. . . . VICTOR L. BOWERS has returned as chairman of the department of industrial-arts education, Southwest Texas State Teachers College, San Marcos, after serving as a training administrator for the San Antonio Air Technical Service Command, Kelly Field, Texas. . . . HAROLD W. PORTER, member of the staff of the Wisconsin State Board of Vocational and Adult Education, Madison, has joined the faculty of Purdue University, Lafayette, Indiana, as teacher trainer in trade and industrial education. . . . M. J. HORSH, superintendent of schools at West View, Penna., has been appointed president of West Virginia Institute of Technology, Montgomery, succeeding EDWARD S. MACLIN, resigned. . . . RALPH W. E. BOWERS, formerly assistant state supervisor of trade and industrial education in charge of industrial arts for Louisiana, has been appointed head of the department of industrial-arts education at Southwestern Louisiana Institute, Lafayette. . . . GUY WULFING, formerly director of vocational education for the Gary, Indiana, schools, has retired after 38 years of service with the system. . . . RALPH W. WHALIN has returned to his position as head of the industrial-arts department, Eastern Kentucky State Teachers College, Richmond, after serving on the staff of the instructor training department, The Armored School, Fort Knox, Kentucky. . . . OWEN HARLAN of Eastern Illinois State Teachers College, Charleston, has been appointed an instructor in industrial education at the University of Missouri, Columbia. . . . IRWIN H. ENLI has returned to teaching industrial arts at Omro, Wis., after working at an aircraft plant.

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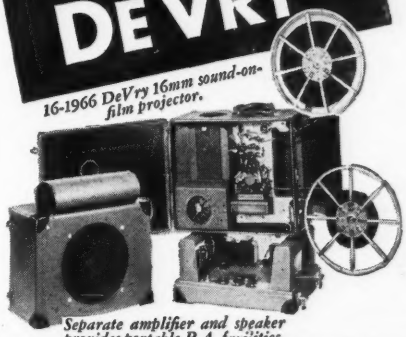

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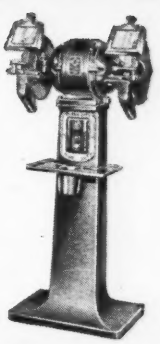

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THE apprenticeship business continues to boom and Washington officials are doing all they can to make it boom even more. To wit:

The Apprentice Training Service, now installed in the U. S. Labor Department, is being raised to the level of an important division, under the aegis of the Second Assistant Secretary, Edward C. Moran, Jr.

The Labor Department is asking Congress for an additional $431,500 to expand the ATS in order to be able to attract greater numbers of veterans as apprentices.

The U. S. Employment Service is instructing its 1500 local office staffs to "talk up" apprenticeship possibilities with all young applicants. The USES recently sent out a special training booklet to its field offices under the title *Why Discuss Apprenticeship Now?*

» This very question was answered by Rep. John McCormack (Mass.) on the floor of the House—further focusing attention on apprenticeship. Said Rep. McCormack:

"America reached its place as the greatest industrial nation of the world through the skill and ingenuity of its craftsmen. We have always been able to out-produce every other nation on this account. If we are to continue to occupy this position and maintain the high standards of living and safeguard our future security, we must take immediate steps to replenish our reservoir of skilled workmen."

Pointing to some "startling facts," Rep. McCormack said that in 1940 we had 5,000,000 skilled tradesmen in the United States. About 5 percent were over 65 years of age then, which means that those still at work are 70 years old now, that 25 percent had learned their skills in a foreign country, and that only 3 percent were apprentices.

The Apprentice Training Service hurries to add that if we are to maintain this 5,000,000 level, "395,222 apprentices must be employed at all times. 222,000 must be hired and 104,000 must be graduated each year."

Can we get this number of young men into apprenticeship? Rep. McCormack thinks we can. He says: "Current surveys at Army, Navy, and Marine separation centers show that over 10 percent of the dischargees expressed a desire to have a trade. If we consider only one-half this percentage, there will be over 800,000 veterans serving an apprenticeship."

Others are not so optimistic. They say that we shall be doing well to get the 222,000 apprentices a year we actually are shooting for. However, ATS officials are "surprised and gratified" that from May to October, 1945, some 7000 plants had set up apprentice programs. These plants, it is implied, will attract thousands upon thousands of trainees.

The construction industry, meanwhile, offers the shining example of how to go after apprentices. This industry has an active national committee on apprenticeship and is continually needling its local officials to recruit young men. Apprenticeship standards are being set up by this industry at a fast clip. Already worked out are standards for 12 occupations, including glazier work, roofing, plastering, and bricklaying.

» "Skills which will be useful in future civilian life" would be one of the by-products of universal military training, said President Truman, urging the adoption of his proposal in a personal appeal to Congress. He stressed, however, that skills would be only a *by-product*, the main product being "increased national security."

Looking askance at such by-products are members of the Educational Policies Commission. They say that if we want youth trained in skills and occupations, let the public vocational schools, not the Army, do the job. In fact, most educators in Washington, as well as the EPC, are looking askance, also, at military training as a whole.

Congress is also unenthusiastic. More Congressmen and Senators are making speeches against military training than for it. But, then, both opponents and proponents are holding their hottest fire until after the House and Senate committees end their hearings on this proposal and the bill is brought up for debate. This may not happen until June, 1946.

» Long-pending educational measures are stalled in a Congress which is stalling even on major reconversion bills demanded by the White House. However, legislation seeking to expand vocational education inched a bit closer to passage when Rep. Barden (N.C.) introduced a companion bill to S. 619. The new measure, numbered H. R. 4384, is designed to avoid some bookkeeping tangles which would result should S. 619 be passed. At the same time, however, the new Barden measure cuts down the appropriations called for by S. 619 to the following:

For area vocational schools, from $24 million to $16 million; for agricultural education, from $23 million to $20 million; for home economics from $16 million to $14 million; for trades and industrial education, from $16 to $14 million; for distributive occupations,

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